

March 16, 2011



U.S. Department  
of Transportation

East Building, PHH – 30  
1200 New Jersey Avenue, Southeast  
Washington, D.C. 20590

**Pipeline and Hazardous  
Materials Safety Administration**

DOT-SP 7945  
(EIGHTEENTH REVISION)

**EXPIRATION DATE: February 28, 2015**

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: Pacific Scientific Company  
HTL/Kin Tech Division  
Duarte, California
2. PURPOSE AND LIMITATION:
  - a. This special permit authorizes the manufacture, marking, sale and use of a non-DOT specification cylinder conforming to all regulations applicable to DOT specification 4DS, except as specified herein, for use in transporting materials authorized under this special permit. This special permit provides no relief from the Hazardous Materials Regulations (HMR) other than as specifically stated herein. The most recent revision supersedes all previous revisions.
  - b. The safety analyses performed in development of this special permit only considered the hazards and risks associated with transportation in commerce.
3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.
4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR § 173.304a(a)(1) and § 175.3 in that non-DOT specification cylinders are not authorized, except as specified herein.
5. BASIS: This special permit is based on Pacific Scientific's application dated December 20, 2010, submitted in accordance with § 107.105 and the public preceding thereon.

6. HAZARDOUS MATERIALS (49 CFR § 172.101):

Hazardous Materials Description			
Proper Shipping Name	Hazard Class/Division	Identification Number	Packing Group
Compressed gases, n.o.s. (containing bromotrifluoromethane, pentafluoroethane, or iodotrifluoromethane)	2.2	UN1956	N/A
Heptafluoropropane (R227)	2.2	UN3296	N/A
Fire Extinguishers	2.2	UN1044	N/A
Compressed gases, n.o.s. containing NOVEC 1230 (FK-5-1-12), Nitrogen	2.2	UN1956	N/A

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Packaging prescribed is a welded steel non-DOT specification cylinder conforming with DOT Specification 4DS( §§ 178.35 and 178.47) except as follows:

§ 178.47(a) *Type, size and service pressure.*

Applies except that service pressure must be at least 500 psig but not over 1,500 psig.

§ 178.47(b) *Steel.*

(a) Type nitronic 40 (ARMCO 21-6-9) austenitic stainless steel with analysis as follows:

	Percent
Carbon	0.04 Max.
Manganese	8.00/10.00
Phosphorus	0.060 Max.
Sulfur	0.030 Max.

Silicon	1.00 Max.
Chromium	19.00/21.50
Nickel	5.50/7.50
Nitrogen	0.15/0.40

§ 178.47(f) *Wall thickness.*

Minimum wall thickness for any cylinder shall be 0.040 inch. Minimum wall thickness shall be such that the wall stress does not exceed 45,000 pounds per square inch, at the marked service pressure.

- (1) Calculation for sphere must be made by the formula:

$$S = 0.25(PD/tE)$$

where:

S = Wall stress in pounds per square inch.  
P = Service pressure, psig.  
D = Outside diameter, inches.  
t = Minimum wall thickness, inches.  
E = 0.85 (provides 85 percent weld efficiency factor which must be applied in the girth weld area and heat affected zone which zone shall extend a distance of 6 times wall thickness from center of weld); E = 1.0 (for all other areas).

- (2) Calculation for a cylinder must be made by the formula:

$$S = P(1.3D^2 + 0.4d^2) / (D^2 - d^2)$$

where:

S = Wall stress in pounds per square inch.  
P = Service pressure, psig.  
D = Outside diameter, inches.  
d = Inside diameter, inches.

§ 178.47(g) *Heat treatment.*

Cylinders may be stress relieved or annealed for

forming. Welded cylinder shall be stress relieved at a temperature of 900 °F ± 25 °F after process treatment and before hydrostatic test.

§ 178.47(n) *Acceptable results for flattening and burst tests.*

(1) Flattening required to 50 percent of the original outside diameter without cracking except flattening test not required for spheres.

(2) Burst pressure shall be at least 3 times service pressure or 4/3 times the test pressure whichever is greater.

§ 178.35(g) *Marking.*

Applies except the marking "DOT-SP 7945" must be substituted for the DOT-4DS specification marking and followed by the service pressure and the Test Pressure marking, (TP-\_\_\_\_), followed by the pressure at which the cylinder was tested, for example, "TP-3,000" must precede or be located immediately above the test date.

b. TESTING - Retest and reinspection must be in accordance with § 180.205, as prescribed for DOT Specification 4DS cylinders, except that the retest pressure must be that stamped on the cylinder.

8. SPECIAL PROVISIONS:

a. In accordance with the provisions of Paragraph (b) of § 173.22a, persons may use the packaging authorized by this special permit for the transportation of the hazardous materials specified in paragraph 6, only in conformance with the terms of this special permit.

b. A person who is not a holder of this special permit, but receives a packaging covered by this special permit, may reoffer it for transportation provided no modification or change is made to the packaging and it is offered for transportation in conformance with this special permit

c. A current copy of this special permit must be maintained at each facility where the package is offered or reoffered for transportation.

- d. Each packaging manufactured under the authority of this special permit must be marked with a registration symbol designated by the Office of Hazardous Materials Special Permits and Approvals for a specific manufacturing facility.
  - e. A current copy of this special permit must be maintained at each facility where the package is manufactured under this special permit. It must be made available to a DOT representative upon request.
  - f. The cylinder must be shipped in strong outside packagings in accordance with § 173.301(a)(9). The pressure vessels transported under this special permit may include properly approved actuating cartridges (Division 1.4C or 1.4S) installed in the discharge outlet without changing the classification of Division 2.2, provided the aggregate quantity of deflagrating (propellant) explosives does not exceed 3.2 grams per cylinder cartridge.
  - g. Cylinders are for aircraft use only.
  - h. Packages specified herein marked "DOT SP 5861" prior to March 20, 1976, or "DOT-E 5861" prior to June 1, 1978, and which meet the requirements of the edition of DOT SP 5861 or DOT-SP 5861 in effect at the time of manufacture, may be transported under the terms of this special permit.
  - i. A copy of the inspector's report specified in § 178.47-23 on the first lot of each design of cylinders produced with a service pressure greater than 900 psig must be submitted to the Office of Hazardous Materials Special Permits and Approvals (OHMSPA) prior to initial shipment.
6. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle, rail freight, cargo vessel, cargo aircraft only, and passenger-carrying aircraft.
10. MODAL REQUIREMENTS: A current copy of this special permit must be carried aboard each cargo vessel, aircraft or motor vehicle used to transport packages covered by this special permit. The shipper must furnish a current copy of this special permit to the air carrier before or at the time the shipment is tendered.

11. COMPLIANCE: Failure by a person to comply with any of the following may result in suspension or revocation of this special permit and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. 5101 et seq:

- o All terms and conditions prescribed in this special permit and the Hazardous Materials Regulations, 49 CFR Parts 171-180.
- o Persons operating under the terms of this special permit must comply with the security plan requirement in Subpart I of Part 172 of the HMR, when applicable.
- o Registration required by § 107.601 et seq., when applicable.

Each "Hazmat employee", as defined in § 171.8, who performs a function subject to this special permit must receive training on the requirements and conditions of this special permit in addition to the training required by §§ 172.700 through 172.704.

No person may use or apply this special permit, including display of its number, when this special permit has expired or is otherwise no longer in effect.

Under Title VII of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) - 'The Hazardous Materials Safety and Security Reauthorization Act of 2005' (Pub. L. 109-59), 119 Stat. 1144 (August 10, 2005), amended the Federal hazardous materials transportation law by changing the term "exemption" to "special permit" and authorizes a special permit to be granted up to two years for new special permits and up to four years for renewals.

12. REPORTING REQUIREMENTS: Shipments or operations conducted under this special permit are subject to the Hazardous Materials Incident Reporting requirements specified in 49 CFR §§ 171.15 Immediate notice of certain hazardous

materials incidents, and 171.16 Detailed hazardous materials incident reports. In addition, the grantee(s) of this special permit must notify the Associate Administrator for Hazardous Materials Safety, in writing, of any incident involving a package, shipment or operation conducted under terms of this special permit.

Issued in Washington, D.C.:



for Dr. Magdy El-Sibaie  
Associate Administrator for Hazardous Materials Safety  
Address all inquiries to: Associate Administrator for Hazardous  
Materials Safety, Pipeline and Hazardous Material Safety  
Administration, U.S. Department of Transportation, East Building  
PHH-30, 1200 New Jersey Avenue, Southeast, Washington, D.C.  
20590.

Copies of this special permit may be obtained by accessing the  
Hazardous Materials Safety Homepage at  
[http://hazmat.dot.gov/sp\\_app/special\\_permits/spec\\_perm\\_index.htm](http://hazmat.dot.gov/sp_app/special_permits/spec_perm_index.htm)  
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PO: CHH/sln